Knowledge Management in Medicine

Beyond Data, Information, and Technology

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Knowledge Management

- What is it?
- Why is it?
- How has it been used?
- How is it applicable to medicine?
- How can we make it work?

Knowledge

- Data
  - Figure, Symbols
- Information
  - Meaning
- Knowledge
  - Ability to Apply and Use Information

Knowledge Challenge

- Individual
  - More than can be acquired, stored, and retrieved
- Organizational
  - Inefficient distribution/transfer application of knowledge at the product/service level

Levels of Knowledge

- Cognitive Knowledge
  - Know What….
- Skilled Knowledge
  - Know How….
- Understanding Knowledge
  - Know Why….
- Visionary, Proactive Knowledge
  - Care Why….

Knowledge Management Movement

- Industry response to overseas competition
- Systematic application of evidence and data with rational analysis to improve production
- Organizational framework for learning and growth of knowledge
- More than information management

Knowledge Management

- What is it?
  - Concurrent Development, Integration and Application of Knowledge to optimize production/mission success
- How?
  - Engineering and leveraging of the collective information, organizational intelligence, resources and technology with CQI methods
- Why?
  - Improve Collective Organizational IQ (Borg)
  - Competitive Edge

IM - KM Relation

- As the amount of information expands and exceeds individuals' abilities to store and retrieve a storage/retrieval system is developed - filing system: culturally dependent
- IM is the principle amplifying tool of a KM strategy
- IM amplifies the knowledge worker (KW)

Pillars of Knowledge Management

- Acquisition
- Storage
- Transformation - (Digestion)
- Application

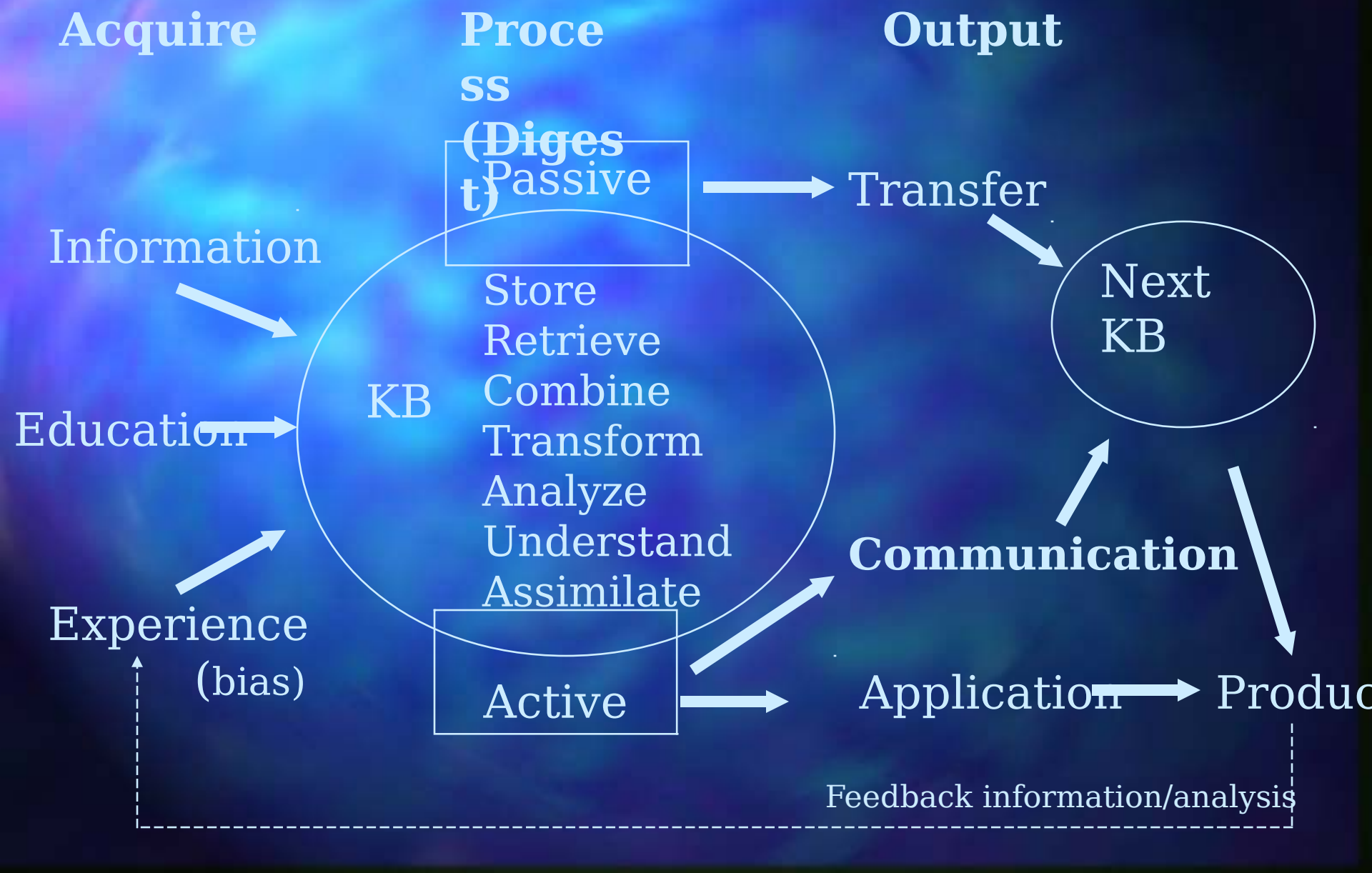
Pillars of Knowledge Management (Expanded)

- Create
- Validate
- Standardize
- Enhance current knowledge
- Replace existing knowledge
- Combine available knowledge
- Distribute
- Identify deficits

Knowledge Bearers (KBs)

- Passive
  - Knowledge Repository
    - Store, Hold, Retrieve
      - Examples: Texts, Periodicals, Data Storage Systems
- Active
  - Knowledge Integrators (Digester)
    - Store, Hold, Retrieve (generally lesser ability)
    - Interpret, Combine, Synthesize
      - Examples: People, AI, Information Processors
  - Knowledge User
    - Apply
      - Examples: People, AI+robotics

(CoDIAK)


Acquire
Process (Digest)
Output
Passive
Transfer
Information
Store
Retrieve
Combine
Transform
Analyze
Understand
Assimilate
Next KB
KB
Education
Communication
Experience
(bias)
Active
Application
Produc
Feedback information/analysis

CoDIAK

Concurrent

Development

Integration

and

Application

of

Knowledge

Engelbart (Bootstr

Barriers to Success

- Current Value System
  - He Who Has the Most Information is Most Valued
  - Getting Ahead is often Determined by Who is Most Valuable to the Boss
- Acceptance of Knowledge
  - Given the Correct Information Reasonable People……

Acceptance of Knowledge

- Critical/rational
  - Evidence
  - Conviction
- Intuitive/emotional
  - Feels right
  - Paradigm
  - Beliefs

Knowledge Management in Medicine

- Historical Perspective
  - Knowledge Explosion Led to Specialization
  - Consequences: Compartmentalization
- Mayo Clinic
  - Medical Developments Outpacing Ability of Medical System to Incorporate

Medical Knowledge Bearers (Clinical)

- Clinical
  - Health Professionals
  - Literature
  - Texts
  - Bulletins
  - Organizational Policies
  - Practice Guidelines
  - Information Systems/Data Repositories

Medical Knowledge Bearers (Administrative)

- Administrative
  - Administrators
  - Clerical Personnel
  - Catalogues
  - Manuals
  - Legal Sources
  - Sources of Resources
  - Information Systems and Data Repositories

Criteria to Evaluate Knowledge Bearing Instruments

- Availability
  - Retrievable: Location
  - Timeliness
  - Format
- Content
  - Currency
  - Reliability
  - Relevance
  - Transparency

Brailer (Wharton)

Evaluating Knowledge Bearing Instruments

- Sports Page
  - Availability
    - Format +
    - Timeliness +/-
    - Accessibility +
  - Content
    - Reliability +
    - Relevance +
    - Transparency +
    - Currency +/-

Evaluating Knowledge Bearing Instruments

- Periodicals: Medical Scientific Literature
  - Availability
    - Format ?
    - Timeliness -
    - Accessibility -
  - Content
    - Reliability +
    - Relevance +/-
    - Transparency +
    - Currency +/-

Evaluating Knowledge Bearing Instruments

- Texts
  - Availability
    - Format +
    - Timeliness -
    - Accessibility -
  - Content
    - Reliability +/-
    - Relevance +/-
    - Transparency +
    - Currency -

Evaluating Knowledge Bearing Instruments

- Consultants (internal technology transfer)
- Availability
  - Format ?
  - Timeliness ?
  - Accessibility ?
- Content
  - Reliability +/-
  - Relevance +
  - Transparency +
  - Currency ?

Evaluating Knowledge Bearing Instruments

- Information Systems
- Availability
  - Format -/?
  - Timeliness +
  - Accessibility +
- Content
  - Reliability ?
  - Relevance ?
  - Transparency +/-
  - Currency ?

Evaluating Knowledge Bearing Instruments

- Clinical Practice Guidelines
- Availability
  - Format -/?
  - Timeliness -
  - Accessibility -
- Content
  - Reliability +
  - Relevance +
  - Transparency ?
  - Currency ?

KM Applications in Health Care

- Administrative Support
- Clinical Decision Support
  - Provider Empowerment
  - Improved Practices
- Clinical Engineering
  - Disease Management
  - Pathways
- Continuing Education
- Beneficiary Empowerment

How is This Done?

- Leadership Education and Buy-in (Organizations)
- Ask the Pertinent Questions
- Front-end Engineering
- Apply the Criteria
- Build KBS that Devalues Information Hoarding
- *Work With an Appropriate Knowledge Bearer*

Integrating IM with KM: The Pertinent Questions

- The usual IM
  - What information needs to be stored and available?
  - Who needs access? Where?
- Additionally
  - What new knowledge needs to be accumulated?
  - How should it be processed to improve outcomes or provide the competitive edge?
  - What needs to be protected?

Management- Application In Health Care

Clinical Engineering

- Embed Desired Actions
  - Clinical Practice Guidelines
  - Regulations
  - Operating Instructions

"Water Flows Downhill"

Embedded Guideline

Clinical guidelines/decision support embedded in computerized charting/clinical support system

	Pre	During	After
Physician	57%	98%	57%
Lab	63%	83%	52%
Treatment	83%	96%	84%
Cost	$460	$384	$373

Schriger and Baraff, JAMA 1997, Vol. 278

Recommendations for Application of KM in Medicine

- Develop Systems for Knowledge Processing and Dissemination as Part of a KM Strategy
  - Apply KM Criteria Prior to Adopting Systems
  - Point of Service/User Level Engineering
- Incent and Reward Knowledge Sharing
- Develop Strategies for New Knowledge Acceptance

Summary

- Explosion of Knowledge
- Specialization and Compartmentalization Likely to Continue
- Sophisticated IM Improves Ability to Store Retrieve and Process Information
- KM Strategies and Principles Applied with IM/IT Tools Amplify
- Recommendation: Apply Principles to the Customer